

FORM PTO-1449 TO BE FILED WITH
INFORMATION DISCLOSURE STATEMENT

JC971 U.S. PTO
09/903916
07/12/01

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket No. OSU1159-144 Serial No. Not Yet Rec'd

INFORMATION
DISCLOSURE STATEMENT
BY APPLICANTS

Prabir K. Dutta et al.
Applicant

July 12, 2001
Filing Date

2632
Group Art Unit

VAN TRIEU
Examiner's name

U.S. PATENT DOCUMENTS

Examiner's Initial	Document Number	Date	Name	Class/Sub-class
<u>✓</u>	4,470,829	09/11/1984	Hirai et al.	<u>95/140</u>
<u>✓</u>	4,783,433	11/08/1988	Tajima et al.	502/74
<u>✓</u>	4,917,711	04/17/1990	Xie et al.	<u>95/106</u>
<u>✓</u>	5,529,763	06/25/1996	Peng et al.	423/246
<u>✓</u>	5,300,271	04/05/1994	Golden et al.	423/247

FOREIGN PATENT DOCUMENTS

Examiner's Initial	Document Number	Date	Country/Name	Translation? yes/no
	NONE			

OTHER DOCUMENTS

- ✓ 1. US Fuel Cell Council, "Fuel Cell Power for Vehicles", www.usfcc.com, Spring 2001, 28 pp.
- ✓ 2. RAO, Report: "CO Sensors for Fuel Cell Applications", March 2, 2000, 1-11.

09/903916

- ✓ 3. LEE et al., "Removal of CO From Reformate for PEFC Application", Proceedings of the 1998 Fuel Cell Seminar, 1998, 578-581.
- ✓ 4. PENG et al., "CO Adsorbents Based on the Formation of a Supported Cu (CO)Cl Complex", Langmuir 1995, 11 534-537.
- ✓ 5. NOGAMI et al., "Preparation and Nonlinear Optical Properties of Quantum-Sized CuCl-Doped Silica Glass by the Sol-Gel Process", J. Am. Ceram. Soc. 74, 1991, 238-240.
- ✓ 6. OETJEN et al., "Performance Data of a Proton Exchange Membrane Fuel Cell Using H₂/CO as Fuel Gas", J. Electrochem. Soc., Vol. 143, No. 12, December 1996, 3838 – 3842.
- ✓ 7. IGARASHI et al., "Hydrogen Electro-Oxidation on Platinum Catalysts in the Presence of Trace Carbon Monoxide", Journal of Electroanalytical Chemistry 391 (1995) 119-123.
- ✓ 8. SCARANO et al., "Morphology and CO Adsorptive Properties of CuCl Polycrystalline Films: a SEM and FTIR Study", Surface Science 387 (1997) 236-242.
- ✓ 9. MATSUI et al., "Ionic Conductivity of Cuprous Chloride Containing Cuprous Sulfide", J. Electrochem. Soc.: Solid-State Science and Technology, April 1977, 610-614.
- ✓ 10. JOSHI et al., "Electrochemical Studies on Single Crystalline CuCl Solid Electrolyte" J. Electrochem. Soc.: Electrochemical Science and Technology, Vol. 122, No. 8, August 1975, 1071-1080.
- ✓ 11. JOW et al., "The Effect of Dispersed Alumina Particles on the Electrical Conductivity of Cuprous Chloride", J. Electrochem. Soc.: Solid-State Science and Technology, Vol. 126, No. 11, November 1979, 1963 – 1972.
- ✓ 12. HAKANSSON et al., "Preparation and Structural Characterization of Cu (CO) Cl" Inorg. Chem. 1990, 29, 5241-5244.
- ✓ 13. IDA et al., "The Preparation and Properties of Polycrystals of Solid Electrolyte Ultrafine Particles", Surface Review and Letters, Vol. 3, No. 1 (1996) 41-44.
- ✓ 14. SEGUIN et al., "Preparation of Thin Films of Copper (I) Bromide by R.F. Sputtering: Morphology and Electrical Properties", Thin Solid Films 323 (1998) 31-36.
- ✓ 15. VILLAIN et al., "Study of Polycrystalline CuBr and the Interface Cu/CuBr by Impedance Spectroscopy", Solid State Ionics 83 (1996) 191-198.

09/903,916

- ✓ 16. SEQUIN et al., "Mixed Ionic-Electronic Conducting Thin-Films of CuBr: A New Active Component for Gas Sensors?", Sensors and Actuators 74 (1999) 237-241.
- ✓ 17. LAUQUE et al., "Electrical Properties and Sensor Characteristics for NH₃ Gas of Sputtered CuBr Films", Sensors and Actuators B 59 (1999) 216-219.
- ✓ 18. LAUQUE et al., "Electrical Properties of Thin-Films of the Mixed Ionic-Electronic Conductor CuBr: Influence of Electrode Metals and Gaseous Ammonia" Journal of European Ceramic Society 19 (1999) 823-826.
- ✓ 19. DUDFIELD et al., "Evaluation and Modelling of a CO Selective Oxidation Reactor for Solid Polymer Fuel Cell Automotive Applications", Journal of Power Sources 85 (2000) 237-244.
- ✓ 20. ROHLAND et al., "The PEMFC-Integrated CO Oxidation – A Novel Method of Simplifying the Fuel Cell Plant", Journal of Power Sources 84 (1999) 183-186.
- ✓ 21. SCHMIDT et al., "Influence of CsCu₂Cl₃ on the Electrical Conductivity of CuCl", Solid State Ionics 112 (1998) 63-67.
- ✓ 22. IDA et al., "The Preparation and Properties of Polycrystals of Solid Electrolyte Ultrafine Particles", Surface Review and Letters, Vol. 3, No. 1 (1996), 41-44.
- ✓ 23. MATSUI et al., "Ionic Conductivity in Pure and Cadmium-Doped Cuprous Iodide", J. Electrochem. Soc.: Solid-State Science and Technology, February 1977, 300-305.
- ✓ 24. CHANG et al., "The Effect of Particle Size on the Electrical Conductivity of CuCl (Al₂O₃) Composites" Plasma-Deposited Si₃N₄, Vol. 131, No. 5, May 1984, 1213-1214.
- ✓ 25. HSUEH et al., "Thermoelectric Power of CuCl Containing CdCl₂" The Journal of Chemical Physics, Vol. 39, No. 12, December 1963, 3519-3522.
- ✓ 26. GURBUZ et al., "High-Temperature Tolerant Diamond Diode for Carbon Monoxide Gas Detection", Journal of Applied Physics, Vol. 84, No. 12, December 1998, 6935-6936.
- ✓ 27. RIESS et al., "Electrical Conductivity Measurements on Cuprous Bromide, CuBr, in the Presence of Oxygen", Solid State Ionics 59 (1993) 279-286.
- ✓ 28. LI et al., "High-Temperature Carbon Monoxide Potentiometric Sensor", J. Electrochem. Soc., Vol. 140, No. 4, April 1993, 1068-1073.
- ✓ 29. BRUNE et al., "The Electrical Conductivity of Single and Polycrystalline Copper (I) Chloride", Materials Research Bulletin, Vol. 30, No. 5, 573-579 (1995).

09/903, 916

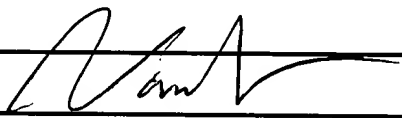
- ✓ 30. RIESS, "Four Point Hebb-Wagner Polarization Method for Determining the Electronic Conductivity in Mixed Ionic-Electronic Conductors", Solid State Ionics 51 (1992) 219-229.
- ✓ 31. RIESS et al., "Failure of Hebb-Wagner Polarization Measurements Due to Decomposition of the Sample", Solid State Ionics 59 (1993) 99-108.
- ✓ 32. JIANG et al., "A Theoretical Model for Composite Electrolytes –II. Percolation Model for Ionic Conductivity Enhancement", J. Phys. Chem. Solids Vol. 56, No. 8, 1113-1124 (1995).
- ✓ 33. NAKAMURA et al., "Size-Dependent Radiative Decay of Excitons in CuCl Semiconducting Quantum Spheres Embedded in Glasses, The American Physical Society, Physical Review B, Vol. 40, No. 12, 8585-8588.
- ✓ 34. SOGA et al., "A Method of Growing CuCl Single Crystals with Flux", J. Electrochem. Soc.: Solid State Science, April 1967, 388-390.
- ✓ 35. EKIMOV et al., "Quantum Size Effect in Semiconductor Microcrystals", Solid State Communications, Vol. 56, No. 11, 921-924 (1985).
- ✓ 36. MAIER, "Electrical Sensing of Complex Gaseous Species by Making Use of Acid-Base Properties", Solid State Ionics 62 (1993) 105-111.
- ✓ 37. MAIER, "Defect Chemistry and Conductivity Effects in Heterogeneous Solid Electrolytes", J. Electrochem. Soc.: Solid-State Science and Technology, June 1987, 1524-1535.
- ✓ 38. MATSUI et al., "Inorganic Copper Ion Conductors", Solid Electrolytes 1978, 237-252.
- ✓ 39. BHATTACHARYYA et al., "Effective Medium Theory for Ionic Conductivity in Polycrystalline Solid Electrolytes", Solid State Ionics 95 (1997) 283-288.
- ✓ 40. MAIER, "Ionic Conduction in Space Charge Regions", Prog. Solid St. Chem., Vol. 23, (1995), 171-263.
- ✓ 41. LAUER et al., "Conductance Effects of Ammonia on Silver Chloride Boundary Layers", Sensors and Actuators B, 2 (1990) 125-131.
- ✓ 42. FUNKE et al., "On the Dynamics of Frenkel Defect Formation and Ionic Hopping in AgCl, AgBr and β -AgI", Solid State Ionics 86-88, (1996) 141-146.
- ✓ 43. LAUER et al., "Impedance Studies of the Interface Silver Halide/Electronically Conducting Oxide: Detection of an Ionic Space Charge Layer", Solid State Ionics 53-56 (1992) 885-889.

09/903,916

- ✓ 44. VAN HULLE et al., "Space Charge Characteristics of Silver Halide Microcrystals", Phys. Stat. Sol. (a) 44, 229 (1977) 229-236.
- ✓ 45. LAUER et al., "Impedance Spectroscopic Investigation of the Interface Silver Halide/Oxide: Detection of an Ionic Depletion Layer", J. Electrochem. Soc., Vol. 139, No. 5, May 1992, 1472-1479.
- ✓ 46. LIOU et al., "The Ionic Hall Effect in Silver Bromide and Iodide", Journal of Imaging Science, Vol. 34, No. 3, May/June 1990, 109-111.
- ✓ 47. CORISH, "Ionic Conductance in the Silver Halides", Journal of Imaging Science, Vol. 34, No. 3, May/June 1990, 84-88.
- ✓ 48. LASKAR et al., "Defect Properties and Their Transport in Silver Halides", Journal of Imaging Science, Vol. 34, No. 3, May/June 1990, 98-103.
- ✓ 49. DUDNEY, "Enhanced Ionic Conduction in Silver Halide-Alumina Composites", Journal of Imaging Science, Vol. 34, No. 3, May/June 1990, 104-108.
- ✓ 50. LIEB et al., "Effect of Ionic Polarizability on Impurity-Vacancy Association in Silver Halides", J. Phys. Chem. Solids, Vol. 57, No. 1, 101-107.
- ✓ 51. STAIKOV et al., "Effect of Grain Boundaries on the Low-Temperature Ionic Conductivity of Polycrystalline RbAg₄I₅ and Ag₃SBr", Solid State Ionics 93 (1997), 85-93.
- ✓ 52. WINKES et al., "Surface Resistance Measurements at the Metal/Electrolyte Interface of Ag(100) and Ag(111) Thin Film Electrodes", Surface Science 400 (1998) 44-53.
- ✓ 53. MAIER, "Defect Chemistry and Conductivity Effects in Heterogeneous Solid Electrolytes", J. Electrochem. Soc.: Solid-State Science and Technology, June 1987, 1524-1535.
- ✓ 54. FRIAUF, "Determination of Ionic Transport Processed in AgCl and AgBr", Journal De Physique, Tome 38, Septembre 1977, 1077-1088.
- ✓ 55. CHOWDHARY et al., "Electrical Conduction in AgI-Al₂O₃ Composites", J. Electrochem. Soc.: Electrochemical Science and Technology, January 1985, 123-124.
- ✓ 56. SHAHI et al., "Ionic Conductivity and Thermoelectric Power of Pure and Al₂O₃-Dispersed AgI", J. Electrochem. Soc.: Electrochemical Science and Technology, Vol. 128, No. 1, January 1981, 6-13.

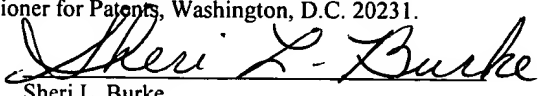
09/903,916

- ✓ 57. LIOU et al., "Ionic Hall Effect in Crystals: Independent Versus Cooperative Hopping in AgBr and α -AgI", The American Physical Society, Physical Review B, Vol. 41, No. 15, May 1990, 10481-10485.
- ✓ 58. KANEDA et al., "Hall Effect of Silver Ions in RbAg₄I₅ Single Crystals", Physical Review Letters, Vol. 29, No. 14, October 1972, 937-939.
- ✓ 59. KNOTEK et al., "The Absence of a Measurable Hall Effect in the Superionic Conductor RbAg₄I₅", Solid State Communications, Vol. 21, 1977, 625-627.
- ✓ 60. NEWMAN et al., "The Ionic Hall Effect in the Solid Electrolyte C₅H₆Nag₅I₆", Electrochemica Acta, Vol. 22, 1977, 811-814.

Examiner 	Date Considered 10/21/02
--	--------------------------

Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

The identification of any document herein is not intended to be, and should not be understood as being, an admission that each such document, in fact, constitutes "prior art" within the meaning of applicable law since, for example, a given document may have a later effective date than at first seems apparent or the document may have an effective date which can be antedated. The "prior art" status of any document is a matter to be resolved during prosecution.

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.10	
"Express Mail" Number: EL622367305US	Date of Deposit: July 12, 2001
I hereby certify that this correspondence is being deposited with the U.S. Postal Service as U.S. Express Mail in an envelope addressed to BOX PATENT APPLICATION, Assistant Commissioner for Patents, Washington, D.C. 20231.	
 Sheri L. Burke	